Small-conductance Ca2+ -activated K+ channels and cardiac arrhythmias.

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Public Summary:
This publication gives an update on the current understanding of the roles of Small-conductance Ca2+ -activated K+ (SK) channels in cardiac arrhythmias and differentiation of stem cells to cardiomyocytes.

Scientific Abstract:
Small-conductance Ca2+ -activated K+ (SK, KCa2) channels are unique in that they are gated solely by changes in intracellular Ca2+ and, hence, function to integrate intracellular Ca2+ and membrane potentials on a beat-to-beat basis. Recent studies have provided evidence for the existence and functional significance of SK channels in the heart. Indeed, our knowledge of cardiac SK channels has been greatly expanded over the past decade. Interests in cardiac SK channels are further driven by recent studies suggesting the critical roles of SK channels in human atrial fibrillation, the SK channel as a possible novel therapeutic target in atrial arrhythmias, and upregulation of SK channels in heart failure in animal models and in human heart failure. However, there remain critical gaps in our knowledge. Specifically, blockade of SK channels in cardiac arrhythmias has been shown to be both antiarrhythmic and proarrhythmic. This contemporary review provides an overview of the literature on the role of cardiac SK channels in cardiac arrhythmias and serves as a discussion platform for the current clinical perspectives. At the translational level, development of SK channel blockers as a new therapeutic strategy in the treatment of atrial fibrillation and the possible proarrhythmic effects merit further considerations and investigations.

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